

White Paper (Review Document)	Source	Document Location	Author(s)	Date	FIFRA 10(g) Protected
The Ecological Significance of Atrazine Effects on Primary Producers in Surface Water Streams in the Corn and Sorghum Growing Region of the United States (Part II)	CD	Folder 2	U.S. EPA	April 15, 2009	No
Appendix III-1: Cosm Data Points and Exposure Profiles	CD	Folder 2	U.S. EPA	April 2009	No
Appendix IV-1: Single-Species Plant Toxicity Test Evaluations	CD	Folder 2	U.S. EPA	April 2009	No
Appendix V-1: Monitoring Data for the 40 AEEMP Sites, 2004-2008	CD	Folder 4	U.S. EPA	April 2009	Yes
Appendix VI-1: Atrazine Use Data in the Corn And Sorghum Areas	CD	Folder 4	U.S. EPA	April 2009	Yes
Appendix VI-2: Soil, Use, Hydrology, and Climate Characteristics for the Upstream Catchment Areas for the AEEMP Monitoring Sites	CD	Folder 2	U.S. EPA	April 2009	No
Appendix VI-3: Additional Monitoring Data Used to Evaluate Vulnerable Watersheds	CD	Folder 2	U.S. EPA	April 2009	No
Reference Documents					
Modeling the Potential for Atrazine-Induced Changes in Midwestern Stream Ecosystems using the Comprehensive Aquatic Systems Model (CASM). Final Report. April 11, 2007. MRID 47174103.	CD	Folder 4	Volz, D.C., S.M. Bartell, S.K. Nair, and P. Hendley.	April 2007	Yes
Atrazine Ecological Exposure Flowing Water Chemical Monitoring Study in Vulnerable Watersheds Interim Report: Watershed Selection Process. Prepared by Waterborne Environmental, Inc., Leesburg, VA for Syngenta Crop Protection, Inc., Greensboro, NC. March 30, 2004. MRID 46249449	CD	Folder 4	Williams, W. M., Harbourt, C.M., Matella, M.K., Ball, M.H., and Trask, J.R.	March 2004	Yes

2007 Interim Report - 2004 - 2006 Data Overview - Atrazine Ecological Exposure Flowing Water Chemical Monitoring Study in Vulnerable Watersheds Interim Report. Prepared by Waterborne Environmental, Inc., Leesburg, VA for Syngenta Crop Protection, Inc., Greensboro, NC. April 16, 2007. MRID 47174102.	CD	Folder 4	Hampton, M. Burnett, G., Carver, L.S., Harbourt, C.M., Hendley, P., Johnston, E.A., Perez, S., Snyder, N.J., and Trask, J.R.	April 2007	Yes
Atrazine Ecological Exposure Flowing Water Chemical Monitoring Study in Vulnerable Watersheds: Analysis of Chemograph Behavior between Grab Samples - Measurement and Hybrid PRZM Approaches. Prepared by Waterborne Environmental, Inc., Leesburg, VA for Syngenta Crop Protection, Inc., Greensboro, NC. August 8, 2007. MRID 47202001.	CD	Folder 4	Snyder, N.J., Harbourt, C.M., Miller, P.S., Trask, J.R., Prenger, J.J., Hendley, P., and Johnston, E.A.	August 2007	Yes
Atrazine Ecological Exposure Flowing Water Chemical Monitoring Study in Vulnerable Watersheds: Approaches to Assessing Potential Watershed Scale Vulnerability for Atrazine Runoff. Prepared by Waterborne Environmental, Inc., Leesburg, VA for Syngenta Crop Protection, Inc., Greensboro, NC. April 20, 2007. MRID 47174101.	CD	Folder 4	Hampton, M. Prenger, J.J., Harbourt, C.M., Hendley, P., and Miller, P.S.	April 2007	Yes
Atrazine Ecological Exposure Monitoring Program Interim Report: Supporting Spatial Data. Prepared by Waterborne Environmental, Inc., Leesburg, VA for Syngenta Crop Protection, Inc., Greensboro, NC. March 30, 2004. MRID 46249450.	CD	Folder 4	Williams, W. M., Harbourt, C.M., Ball, M.H., Matella, M.K., Trask, J.R., and Snyder, N.J.	March 2004	Yes
2007 Interim Report – Addendum to 2004-2006 Overview Report, Atrazine Ecological Exposure Flowing Water Chemical Monitoring Study in Vulnerable Watersheds (Preliminary 2007 Data) . Prepared by Waterborne Environmental, Inc., Leesburg, VA for Syngenta Crop Protection, Inc., Greensboro, NC. November 28, 2007. MRID 47295002.	CD	Folder 4	Hampton, M., Carver, L.S., Harbourt, C.M., Hendley, P., Johnston, E.A., Perez, S., Snyder, N.J., Trask, J.R., and Mayer, T.J.	November 2007	Yes

Review of Interim Report on the Results From the 2007 Atrazine Ecological Monitoring Program (MRID# 47295002) and Recommendations for Monitoring for 2008.	CD	Folder 3	U.S. EPA	March 2008	No
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Charge Questions

Based on the analyses presented in this document, the US EPA will present the following charge questions to the SAP:

The foundation of the US EPA methodology for specifying levels of concern (LOCs) for atrazine exposures in natural freshwater systems is the relationship of atrazine exposure to effects on aquatic plant community structure and function in microcosm and mesocosm (cosm) studies. Comparing effects among the different atrazine exposure time-series in the cosm studies and extrapolating effects to other exposure time-series in natural systems requires an effects model that can be applied to any exposure time-series to provide a consistent, quantitative index for toxic effects on the plant community (Model Effects Index, MEI). MEI values for cosm exposures are used to develop an LOC for the MEI (LOC_{MEI}) that best discriminates between cosm exposures with and without significant effects. MEI values for exposures in natural systems can then be evaluated relative to this LOC_{MEI} .

(1) The effects models considered in this document require effects concentrations (ECs) from single-species plant toxicity tests with atrazine that are consistent with respect to the nature and magnitude of the toxic effects. Reports on and reviews of such tests provide ECs that vary widely in meaning, so a new review was conducted and test results were used to develop a compilation of plant specific growth rate vs. concentration relationships (Section IV.B). Please comment on the strengths and limitations of this review and synthesis of plant toxicity tests for providing toxicity sensitivity distributions for use in the atrazine assessment methodology.

(2) One source considered for the desired MEI is the Comprehensive Aquatic Systems Model (CASM), a community simulation model. In response to a previous SAP review, this model was modified to give a more realistic, dynamic simulation of a Midwestern stream ($CASM_{ATZ2}$). Sensitivity analyses for this revised model were conducted, including some additional analyses suggested in the previous SAP review. These analyses indicated considerable sensitivity of risk determinations to the selection of species toxicity parameters and to various physicochemical variables (Section IV.C). This indicates that $CASM_{ATZ2}$ is more suitable for a site-specific, data-intensive assessment than the generic application that is desired for these atrazine assessments. Please comment on the advisability and value of using $CASM_{ATZ2}$ for generic assessments given these findings and on the nature and feasibility of additional development efforts that would be needed to implement this model.

(3) An alternative source considered for the desired MEI was an index of the severity of toxic impact on a plant assemblage (Plant Assemblage Toxicity Index, PATI) based directly on single-species plant toxicity relationships (Section IV.D). Please comment on the merits and limitations of this source for the MEI. Based on the coherence of risk evaluations between the PATI-based and the CASM-based methodologies, EPA has

concluded that the additional processes included in CASM are not needed for the assessment methodology and that the PATI-based methodology should be adopted. Please comment on the merits of this conclusion.

The Agency identified three sites that exceeded the PATI LOC_{MEI} in multiple years and six sites that exceeded the LOC_{MEI} in one year (Section V). Based on the results of the Agency's watershed analysis in Section VI to identify additional sites that might exceed the atrazine LOC, US EPA proposes two questions for the SAP:

(4) Based on an analysis of watershed characteristics of the 40 monitoring sites, the US EPA concluded that the presence of soils that either have a high runoff potential or are in hydrologic soil group C or D, and have a shallow layer with a moderately low saturated hydraulic conductivity best distinguish sites that exceed the LOC in multiple years from those that do not exceed the LOC. Please comment on the merits of the watershed criteria the Agency used to identify watersheds that might exceed the atrazine LOC.

(5) Neither atrazine use intensity nor rainfall data (annual or monthly) correlate positively with watersheds that exceed the LOC. The Agency noted that the monitoring site selection already focused on areas with sufficient atrazine use to potentially result in high atrazine exposures in streams. Please comment on the Agency's proposed approach to establish a minimum criteria for atrazine use intensity ($> 0.1 \text{ lb ai/A}$) and rainfall (> 23 inches annually).